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A BOOK ABOUT

GRASSES AND CLOVERS

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IT is impossible to cover within the limits of a pamphlet the great subject of grasses and clovers. Hundreds of books have been written on this subject, and as the science of agriculture progresses, hundreds more will doubtless be published.

One of the best books for the man who is interested in this subject from a practical standpoint is "Farm Grasses of the United States," by W. J. Spillman. We can furnish this book for $1.00, postpaid, which is the publisher's price.

We give below a few extracts from this book, and would be glad if every customer of ours who is interested in grasses and clovers would buy a copy of it. In speaking of the grass and hay crop of the country, Mr. Spillman says:

"It is fortunate that at least this important crop must, from its nature, be largely consumed on the land where it is produced. Otherwise we would long ago have reduced the fertility of practically all the farm lands in the country to so low a point as to have rendered farming unprofitable, just as has been done in all the older parts of the country where livestock farming has been neglected. It is a notable fact that in those portions of the country which have enjoyed the most permanent prosperity, the grasses and livestock have always occupied an important place. In the New England States, which have felt keenly the competition of the fertile lands of the Central West, agriculture has been able to maintain itself only by devoting the major portion of the improved land to grasses. Other crops may form the basis of temporary prosperity, as has been the case with wheat on the prairies of the Northwest and the Pacific Northwest, and cotton in the South; but it was a prosperity that rested on too slender a basis, and, in both cases, has led to disaster.

"The Southern States were so unfortunate in their early history as to find their lands and climate adapted to a crop (cotton), that was highly profitable, but which returned nothing to the soil. Livestock farming and grass culture were almost wholly neglected. As the lands wore out, resort was had to commercial fertilizer; but these did not add humus to the soil, and the mechanical condition of the soil has reached that stage where rain washes it so badly that it is necessary to terrace in order to keep the soil from washing away. The results achieved by many progressive farmers in the South show conclusively that a proper use of grasses and stable manure render terracing unnecessary except on decidedly rolling lands, and make the soil highly productive. Diversified farming is rapidly coming into favor in the South, and the area devoted to hay and pasture crops is increasing. This undoubtedly means a return to permanent prosperity.

"The preparation of good alluvial soil for grass in the Middle South does not differ materially from the methods required in the North, but the uplands require considerably more care. It is useless to attempt to grow meadow-grasses on exhausted upland soils in the Middle South. The soil must first be brought into good fertility. This may be done by sowing Southern grown winter rye and turning it under about the time it heads out, and by growing and turning under cowpeas or velvet beans. It is very important, when any heavy green crop has been turned under, to allow it to decay, and let one or two good, soaking rains wash the resulting acids out of the soil before sowing any other crop. A very good preparation for worn upland soils would be to turn under a crop of rye,

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The Importance *of* Grasses *and* Clovers

NO CROP is more important to the farms of the South than the grass, clover and forage crops and there is no crop in which so little interest is taken. Why this is so we have never been able to understand, unless the farmer, recognizing grass as an enemy in his cotton fields, thinks, therefore, that it is an enemy under any and all conditions.

Looking at it strictly from a dollars and cents standpoint, there is hardly a crop that can be grown on general farms in the South that will prove so profitable when properly treated.

We live here in one of the great commercial cities of the South. We see hundreds of carloads of hay coming into Atlanta every year for local consumption. The money for this goes to Ohio, Indiana, Illinois and other Northern States, every dollar of which ought to go into the pockets of farmers in the surrounding counties.

Atlanta and vicinity is no exception to the rule. The same thing is repeated every year in all parts of the South, and it forms one of the items that is constantly draining the South of money for the benefit of Northern and Western farmers, and it is money that ought to stay right here.

The object of this booklet is to show the importance of the culture of grasses, clovers and forage plants in the South; the profitableness of their culture; methods of soil preparation for successful results and descriptions of varieties suitable for the purpose and adapted to the South. In this we have, so far as possible, avoided the use of scientific words and phrases so common in all previously published works, so that any one who can read can understand just what is meant without reference to a dictionary. There is no work on grasses today that we know of that covers the South on this subject that is free enough from scientific language, terms and phrases to be understood by the average reader, and we shall try in this to use simple and easily understood words.

This pamphlet is not written for selling purposes. It is written for the benefit of our friends who are interested in grasses, and for those who are willing to have their eyes opened to the possibilities of grass, clover and forage crops in the South. It is written with the hope that all who may read it may be impressed with the possibilities and profitableness of grass culture on their own farms.

The South lacks grass and it lacks cattle, and the lack of grass and forage crops in abundance means practically no cattle. Our own State of Georgia produces but few beef cattle, but hundreds of thousands of bales of cotton. Georgia ought to grow 400,000 to 500,000 good fat steers every year and could easily do it were our farmers awake to their opportunities, and what is true of Georgia is true of other Southern States. The prosperity of such States as Iowa has been built largely on live stock production. Grass and live stock are an endless chain. As one writer said: "We need more grass to grow

more cattle to make more manure to grow more grass to feed more cattle."

We want to tell right here of two "grass" incidents that have come under our observation during the past two years.

The first occurred in Middle Georgia. One of our good farmer friends down there, who is considered a pretty good farmer, was getting returns from his cotton in the shape of about $25.00 per acre—good average farming, much better than the usual returns. There were some 4 acres on his farm that he had let Bermuda Grass get a start in. He plowed and cultivated and attempted to get rid of the "pesky stuff," but the more he cultivated it the better it grew. One day in the neighboring town he was bewailing the fact that the "derned Bermuda Grass" had taken 4 acres of his good cotton land. A long-headed storekeeper in that town asked him why he didn't make Bermuda Grass hay. The thought of such a thing had never occurred to him, but he got to thinking over the subject good and hard. Next season he put just as much fertilizer on that 4 acres of Bermuda as he did on any 4 acres of his cotton. The Bermuda grew and he made three cuttings of most excellent hay that season. He sold the product of those 4 acres in the neighboring town for $360.75, or slightly over $90.00 per acre. It was an eye-opener to our friend. Now he is running a Bermuda grass farm with a hay-baler attachment. You can't induce him to plant cotton any more.

The second incident occurred recently at the edge of the city of Atlanta. A farmer friend of ours runs a market garden on a little bottom. One side of the bottom, containing about an acre, had become infested with Johnson Grass, and it grew luxuriantly. He had ceased trying to cultivate it, so that he had a pretty complete stand of Johnson Grass. He made hay from this, the first cutting yielding 5 tons, the second 3 tons and the third slightly over 2 tons—10 tons in all. Every ton of this was sold on the ground at $14 per ton, the purchaser hauling it away at his own expense. One hundred and forty dollars per acre is pretty good farming according to our ideas; $90.00 per acre of Bermuda Grass hay beats the best kind of cotton growing all hollow. We know somebody is going to rise up and say that we are advocating the use of pests in the form of Johnson and Bermuda Grass. We are not. They are not pests except when neglected or unprofitably handled. If these "pests" already have possession make use of them either in making hay for sale or by feeding them. If you treat them and handle them right they will bring you in from two to five times as much as any staple farm crop you can grow.

If you don't want to grow these two, there are plenty of other grasses and clovers that you can grow, all of them valuable and profitable. We make no special argument for any variety. We mention Bermuda and Johnson here simply because they were the varieties in these two striking incidents that came under our personal observation.

PREPARATION OF THE SOIL.

We are aware of the fact that tens of thousands have tried to make pastures and meadows by sowing grass seed without any thorough understanding of the subject, and failure, either total or partial, resulted. There were many different causes for these failures, but our observation goes to show that nine-tenths of the failures with grasses and clovers in the South come from insufficient preparation of the soil in which the seed is sown. To get the ground in the right condition (on the supposition that the highest grade seed is used) is about nine-tenths of the battle of getting a full stand of grass or

clover, and that's right where the majority fall down and fall down hard. Few of them stop to realize how very small the average grass seed is, running often 100,000 seeds to the pound. A tiny seed like that is not going to push through a big clod that a big seed like corn, cotton or cowpeas would either push through or come around. When the tiny grass plant starts it has got to have ready for it an easy path to light and warmth. If, as it comes toward the surface, it strikes a clod an inch square, its days are numbered then and there. The soil must be reduced to the finest possible particles, as close to dust as possible. The process of soil preparation begins with a deep plowing, one that gets right down to the sub-soil and brings some of it to the surface. Then plow it again crossways so that the whole field gets thoroughly broken up. Then begin running your harrows and keep them going until every particle of earth is reduced to as near dust as possible down as far as your plow went. If you have prepared your land in this way you won't have much trouble in getting a full stand of clover or grass. Naturally it means time and trouble to get the seed-bed in this condition, but it pays. You are practically sure of a full stand and with half the quantity of seed necessary where only common preparation of the soil has been made. Right here let us make a suggestion. Prepare your ground for wheat, rye, oats or any grain crop in a manner similar to what we have given above and see what a splendid stand you will get and what enormous yields of grain come your way.

Let us again repeat that almost all failures in getting a stand of grasses and clovers have come through failure to thoroughly prepare the land in advance of seed sowing.

We have got into the habit of preparing the land in a rather rough manner for corn and cotton, and such crops will grow with indifferent treatment, but it don't go with grass and clover.

Remember, that you can't get your soil worked down too fine and that every day's extra labor put on means that much better stand; furthermore every working and cultivation tends toward the destruction of weeds that are constantly germinating and are a menace to the success of a grass crop. The weeds ought to be killed, so far as possible, in advance of seed sowing. It's impossible to destroy them after the grass germinates without destroying much of the young grass.

A word about the different soils. All land will grow grass of some kind and this question of adaptability of the different kinds of grasses to the different soils is given in the description of the different varieties and will not be touched on here.

To get the best results with grasses and clovers the soil on which they are sown should have plenty of humus or decayed vegetable matter in them. Crops of cowpeas, velvet beans, beggar weed or other leguminous crops turned under are the best possible preparation you can give. Grass is not a soil-enriching crop in itself, any more than corn or wheat. You need not think that an old, washed-out hillside, or a field that has been cropped until it won't make 5 bushels of corn per acre, is going to make a profitable grass crop. If you are figuring that way, you had better quit before you begin. Grass and clover crops need and ought to have the best attention you can give. It looks like a big lot of trouble to prepare your ground according to directions given in this pamphlet, but you must remember that most of these grasses and clovers are perennial and last for years, and the better you prepare your land at the start, the longer your pastures and meadows will last and the greater will be the yields every year. You

can grow grass in a "scrubby" sort of a way, just as a farmer can raise "bumblebee cotton" and make a quarter of a bale per acre, but it don't pay. If you are going to grow grass, you want to grow it profitably, and the only way to grow it profitably is to grow it right. Better let it alone unless you are prepared to do this.

SEED QUALITY AND SEED ADULTERATION.

In no other branch of the seed trade is there such opportunity for adulteration, and in no other branch of it is there so much adulteration as in grass and clover seed, and there is no one so largely responsible for this adulteration as the grass-seed-buying farmer.

In grass-seed buying there is a splendid chance for the farmer to use common sense, and he seems to use less common sense in grass-seed buying than anything else.

All of this adulteration comes from the seeking to save the last nickel on the price of a bushel of seed. There are several hundreds of dealers, including ourselves, selling grass and clover seed, and with the great majority of us that are rated as reliable there is very little difference in the prices of the same grade of seed. We are all figuring on getting about the same amount of profit out of each bushel we sell, and in grass and clover seed that profit is a very small one.

The seed-buying farmer comes to us, or to any of our reputable friends, and asks prices on orchard grass. We have no orchard grass except the highest grade we can buy. We name him a price of $2.25, which we will suppose is the market price at that time. Our farmer friend shakes his head and passes on down the street to a hay and grain warehouse. He finds orchard grass at $1.90 to $2.00, and immediately bites at the bait. He does not seem to realize that there are five or six grades of orchard grass on the market and that he has paid $2.00 for an inferior stock that cost the dealer $1.40 to $1.50, when he could have bought stock actually costing $1.90 to $2.00 from the grower from us at $2.25, and got full value in pure, unadulterated, vital seed, free from weed seed. He goes home chuckling over the fact that he saved 25 cents in buying grass seed—but how much has he saved? He has got the lowest grade on the market; paid the grain dealer more profit than he would have paid us and has seed that will give but a partial stand of grass and generally a pretty full stand of weeds. The dealer, or the ones he purchases from, adulterates the seed so that this low price can be made. We were talking not long since with one of the largest grass-seed dealers in the United States. In the course of our conversation he stated that many firms in the seed trade demanded adulterated, low-grade, low-priced grass and clover-seed stock. He stated to us that they were daily in the habit of fixing up grades of grass seed to suit the prices that their customers are willing to pay. In orchard grass, he stated that absolutely pure, high-grade seed might be worth $2.00 to $2.50 per bushel, but that they could have at the same time adulterated and inferior grades as low as $1.00. The difference was entirely in the quality, yet a large percentage of their sales were of this adulterated stuff, and the farmer, hunting to save in the purchase price, is responsible for this whole procession of adulterated grasses and clover. He gets just about what he is willing to pay for, and, in grass and clover-seed buying of this character, every cent that he saves in purchase price costs him dollars in the end. It's about time for seed buyers to learn that they cannot get high-quality grass and clover seed at a low-grade price. The dealer is not in business for

his health only, nor for accommodation. You can't buy a pair of shoes worth $5 for $2.50; you can't buy a $15 suit of clothes for $8; you can't buy a full-blooded Berkshire hog for the price of a piney-woods "razor back"; you can't get a $150 mule for $75; neither can you get the highest grade grass or clover seed at less than it is actually worth. If you are satisfied with the low grade, we have nothing to say beyond the fact that you might as well quit grass culture before you begin so far as your chances of success are concerned.

We have given you some straight talk about this grass-seed buying. We have only mentioned orchard grass, but the same is true of every variety of grass and clover on the list. If you get bit buying low-grade, low-priced grass seeds after reading this, you have no one to blame but yourself. In this world you get just about what you pay for.

So far as our own firm is concerned, we handle only one grade of grass, clover and forage seeds, and that is the highest grade that we can get. Our prices may seem high as compared with prices offered by some other houses, but there is a reason for that difference in price and that reason is the difference in quality. In grass-seed buying, as in everything else, the best you can buy will always be found the cheapest in the end.

HINTS ON GRASS CULTURE.

We have referred previously to the necessity of thorough breaking and preparation of the soil, and we wish to again emphasize it. Lands intended for meadows should be prepared in the very best manner. Not only should the drainage be made perfect (if not so naturally), but the soil should be as well prepared as for the growing of the most highly cultivated crops. It should be put in the finest mechanical condition. Every trace of wild growth and of unimproved land should be worked out. Stumps should be extracted so that mowers and horse rakes may be used. All bushes, roots, stones, trash, brush and the turf of wild grasses and weeds should be removed or destroyed. The cultivation of the land for a few years in crops requiring clean cultivation and high fertilization is probably the best preparation for a meadow. A crop of annual grass such as millet, fits the land for a perennial meadow by destroying the weeds. New lands with fertile soils, however, when put in good tilth, grow the meadow grasses to perfection. If old land is selected it should be deeply plowed and, if possible, sub-soiled, for deep tillage is essential to the luxuriant growth of the perennial grasses. Their roots constantly seek a lower level, and if the land is at first drained and afterwards fertilized year after year and kept free from noxious weeds, the meadow will grow stronger and better with time.

SEED SOWING AND THE RIGHT TIME.

The best time for sowing the perennial grasses and clovers for meadows and pastures in the lower half of the South is from the 1st of September till the 1st of November, varying according to the seasons. Where it is not practicable to sow during the fall, good stands can usually be had by sowing in February and March. Still we would advise fall sowing wherever possible, as the winter rains greatly help in establishing the stand, whereas spring sowings are quite apt to get caught in the May and June droughts, which frequently occur before the young grass plants are deeply enough rooted to survive a protracted dry spell.

The quantities of seed to be sown to the acre are given under description of different varieties of grass. In sowing,

it is best to mark off the land in such width as can be conveniently sown, dividing the seed for such portion, sowing one-half in going one way over that portion of the land, then returning the same way sowing the other half, so that it is spread uniformly all over the field. It is important that the grass seeds be covered carefully, to a depth of not more than half an inch. Clover and some of the larger seeds will germinate and grow at the depth of an inch. After the seeds are sown they should be covered with a roller or a light brush and all stock kept out. Many farmers sow grass seed in the fall of the year with wheat. This is poor economy. A meadow should be sown for its own sake. In trying to save the cost of preparing the land a second time there results, in a majority of instances, the total loss of the grass seed. At any rate, in sowing grass seed with wheat, rye or barley, a whole year and a half must elapse before any returns can be realized from the meadow. Another objection to this method is the temptation to pasture the stubble lands during the heated term and so destroy or impair the vitality of the grasses. If the soil has been properly prepared and a sufficient amount of good grass seed sown along in the early fall one may expect with the greatest confidence a good crop of hay the succeeding summer. Oftentimes the heaviest crop of hay is the first one. This arises from the fact that too close mowing the first year frequently kills a portion of the meadow grasses, leaving bare spots.

CARE OF PASTURES AND MEADOWS.

Land used for pasture yields more nourishment than where the grass is mowed off. Young shoots are more nourishing and digestible than the dry grass. Care should be used, both in pastures and meadows, never to graze or cut grass too close. Especially should this be the case in dry spells in the summer. There is great injury from this cause. Cattle, and sheep especially, should not be put on the grass too early in the spring, before the grass has commenced to grow.

It is better to mow grass the first season, instead of pasturing. With careful management and proper manuring, meadows and pastures will last for years and yield double the quantity of feed. The droppings from animals grazing on the grass will help considerably to keep up the growth, but it will be found beneficial to help this with an occasional top-dressing, at least every two years, of pure animal bone meal. A top-dressing of land plaster at the rate of 150 pounds per acre, applied early in the spring, is also of decided benefit. Grass for hay should always be cut before the seed ripens, otherwise it not only makes an inferior quality of hay, but also takes much more strength from the ground.

TREATMENT OF MEADOWS.

It frequently happens that a meadow becomes "hide-bound," that is to say, the soil and sub-soil run together and become very compact, either from tramping of stock or from standing water. When this is the case, the grass will show a diminished vitality by turning yellow. Under these conditions it will rarely grow tall enough to be mowed. The best remedy for this "hide-bound" condition is to take a very narrow sub-soil plow, with a coulter attached, and run it at intervals of two feet through the meadow and as deep as possible. This will roughen some places, but by running a fine-toothed harrow over it may be made sufficiently level for the mower. The best time for this sub-soiling is early in the spring, as soon as the ground becomes dry enough to plow. Old meadows may be made productive by pursuing this plan and top-dressing with manure directly afterwards. This same treatment should

be given to pastures after they have ceased to be productive. Be sure to destroy the broomsedge.

Grazing the aftermath, which many farmers practice, does much damage to the meadow, to say nothing of the injurious effects resulting from the heavy tread of cattle, especially when the ground is soft and wet. Tramped in this condition the soil becomes, after exposure to the sun, little better than a sun-dried brick. In fact, meadows are put to their severest trials, after they are mowed in June or July, in consequence of the dry, hot weather which supervenes. It is best not to apply stable manure during the continuance of the heated term, for such manure has the effect of making the meadow still dryer and of attracting a number of insects that cover and feed upon the small green blades. The best treatment after mowing is to top-dress with about 100 pounds per acre of the nitrate of soda. This preserves the verdure of the grass. In two or three weeks an application of fertilizers with a large content of potash should be added. Where there is clover, gypsum may always be applied with good results. After the fall rains begin, stable manure should be applied freely. It is the best of all manures, on our soils, for grass lands.

PRICES OF GRASS SEED.

Prices of grass and clover seeds are constantly fluctuating, and it is impossible to give prices in a pamphlet like this that will stand through an entire season. If you want a firm quotation, write us naming variety and quantity, and we shall be pleased to quote you exact price that we can fill your order at.

If you wish a considerable quantity, it is always best to write for prices just before you want to buy. We wish to always give our customers the benefit of the lowest market price at all times. In grass seeds, as in everything else, we have nothing but the very highest grade of seed obtainable. You may rest assured that whatever grass seed you get from us is the pure, unadulterated article, full of vitality. We will not adulterate for the purpose of making a low price under any circumstances. We don't do business on that basis.

Grass seed is the most deceptive article of merchandise in price imaginable and it becomes a mere matter of confidence in placing an order as to quality, trueness of type, etc. It is such an easy matter to adulterate grass seed, and the incentive is so great with some disreputable dealers that the legitimate dealers selling grass seed are very much hampered. The farmers themselves are largely to blame for this, since most of them do not consider quality in purchasing, but will go from one place to another and buy where the cheapest prices are quoted. There is no economy in this kind of proceeding. In fact, it is the rankest kind of extravagance, as we have already shown. We have the best grass and clover seed that is grown. We are ready and willing at all times to quote prices and mail samples to intending purchasers, and if you want special advice as to your own local conditions we want you to feel free to write us fully at any time and ask all the questions you want to. We shall endeavor to answer them as fully as possible and to your profit.

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The soil, climate, and conditions of the Southern States are so different from those of the North that different species of plants, as well as different methods of culture and treatment, are necessary to success in the making of meadows or pastures. The soil is exceedingly variable in character. Much of it has had nearly all of its vegetable matter exhausted by continuous cultivation in cotton. In many sections extreme care is neces-

sary to prevent the washing of hillsides. Severe freezes are rare, so that many of the more hardy plants continue their growth during the entire winter. On the approach of hot weather these plants disappear, and their places are filled by a rank summer growth of plants, many of which are too coarse and unpalatable to be of value for either hay or pasture. Although the growing season is almost continuous for some species, there are none which will make a vigorous growth throughout the year, so that permanent meadows and pastures can be made only with mixtures of several species which make their growth at different seasons.

Sufficient hay for home consumption may be gathered on almost any plantation without expense, except for the harvesting, but such crops are uncertain in amount, are usually inferior in quality, and are rarely such as will assist in preparing the soil for future crops. A good hay plant must not be too rank in its growth, or its stems will be coarse and woody; it must have a large proportion of leaves, which are the most edible parts of the plant; it should be easily cured when made into hay, and it must be nutritious, easily digested, and palatable. If wanted for a permanent meadow, the plant must be a perennial. As the true grasses are of but little value as fertilizers, it is important that, where the crop is to be grown as a part of a rotation, at least one of the species used in any mixture should be a leguminous plant; if the forage crop is to be grown one season only, leguminous plants are always to be preferred.

As we have already said, the ground should be well plowed only a few days before the seed is to be sown, and then harrowed until the surface is thoroughly pulverized and smoothed. If hard and full of clods, a disk harrow is the best thing for pulverizing the soil, and it should be used as soon as possible after the plowing is done before the clods have time to bake. The last harrowing should be done with a harrow, in order to leave the surface as smooth as possible.

Stable manure and cotton seed are the best fertilizers for plowing under before the seed is planted, and a liberal application of these will be all that is needed for two or three years, but on permanent meadows top-dressing must finally be employed to keep them in good condition. It is seldom necessary to use phosphoric acid on soils containing even a moderate proportion of lime, but all the true grasses are heavy consumers of potash and nitrogen, both of which it will pay to supply in liberal quantities. For ordinary soils 50 pounds of potash per acre is a liberal annual application, and this may be secured by using 400 pounds of kainit, or 100 of muriate of potash. Estimating the potash at the rate of 5 cents per pound, the relative value of these fertilizers per ton is as follows: Kainit, $12; muriate of potash, $50; but as market prices are quite variable the selection of the one for use will depend on their local cost.

When phosphoric acid alone is needed, it may be purchased most cheaply in the form of acid phosphate. The cheapest form in which nitrogen can be purchased is as nitrate of soda or as cotton-seed meal, the former having about double the amount of nitrogen contained in the latter. The meal contains approximately 7 per cent. of nitrogen, 3 of phosphoric acid, and 2 of potash, which makes it practically a complete fertilizer. It is also one of the best materials for use as a top-dressing on grass lands.

It apparently makes little difference when phosphatic and potassic fertilizers are applied, but as the nitrogenous fertilizers are very quickly dissolved and lost, they should be applied only for immediate effect. If but one application is

to be made, it should be given when the grass is commencing its growth in the spring. A mixture which has given satisfaction on grass lands containing lime is composed of muriate of potash and cotton-seed meal. For lands deficient in lime the same mixture may be used, and a separate application of acid phosphate added early in the spring. Cotton-seed meal produces little effect on the clovers, and for such crops a mixture of equal weights of ashes and land plaster is most effective, adding the separate application of acid phosphate when the soil is deficient in lime.

There is no machine which will distribute these fertilizers more evenly and economically than can be done by hand.

FORAGE CROPS FOR DIFFERENT SOILS.

No one grass or mixture of grasses will be found best for all localities, but the choice must be varied to meet local conditions. The character of the soil is the principal item to be considered in making a selection for sowing. In that part of the South in which we are principally interested, there are four types of soils which embrace fully nine-tenths of its area. These are (1) the yellow loam and clay uplands, (2) the alluvial river bottom lands, (3) the black prairie regions, and (4) the pine-woods region. For each of these sections different species, different mixtures, and different modes of treatment are required.

YELLOW LOAM SOILS.

The yellow loam and clay uplands include a large part of North Carolina and the northern portions of Georgia, Alabama, and Mississippi. They are also found in northern Louisiana and in some parts of Texas where they merge into the pine-woods lands. The land in the western part of this region, from Mississippi to Texas, is mostly rolling and well drained, contains an abundance of lime, and is naturally very fertile, but often hard and compact, containing but little sand, and suffering severely from drought. In the eastern section the soil generally has less lime, is much lighter and more sandy, and so can be more easily worked. While the crop here is less in quantity than that from the bottom lands, it is superior in quality, being less coarse in fiber, richer in nutritive matter, and less mixed with weeds and coarse grasses.

Bermuda grass, Johnson grass, lespedeza (Japan clover), red clover, and melilotus furnish the principal hay crops of this region, and for a permanent meadow on rich soil Bermuda grass is undoubtedly the best species. Red clover is often sown on the same land with Bermuda grass, but as the two mature at different seasons, and as the clover is seldom permanent, the mixture can hardly be recommended. Hairy or winter vetch, sown in the fall, gives a good crop on Bermuda sod. Bermuda grass meadows may be pastured through the winter without injury. Alsike clover adds greatly to their value at that time, and as it also increases to some extent the hay crop, it is one of the best of the family for sowing on Bermuda grass meadows. Johnson grass gives the largest yield, and if it were not for the ease with which it spreads to adjoining fields and the extreme difficulty with which it can be killed, we should recommend it. Melilotus is the best of the legumes for sowing with it, and as it increases the yield largely makes the hay more palatable, and keeps the soil in better condition, it should be sown on all such meadows. When a crop is wanted to occupy the ground for two years only, red clover, as it yields well, should be sown on the rich soils that are in good condition, and in the South at the present time the hay sells better than that from any other crop.

On the poorer soils, which are not soon to be planted with other crops, lespedeza is perhaps the best plant which can be used, and on lands containing an excess of lime melilotus is the most profitable crop. When the land is to be used for only a single crop of hay, lespedeza is the best for thin clay soils; while for fields in even fair condition cowpeas will be found the most profitable; and on very rich soils German millet may be grown to advantage. For soiling, sorghum, soja beans, and beggar weed do well. These, of course, are all summer-growing crops.

About 165 species of grasses are native to this region, and many of these furnish large amounts of hay. Several species of broom-sedge, *Panicum* and *Paspalum,* and many other native species abound on the uncultivated lands, and if cut sufficiently early, before the seed stems are grown, make hay of fair quality; though if allowed to grow until the seed is ripe, as is too often done, they are of but little value for hay, being tough, wiry, and unpalatable.

The natural pastures in this region are all that can be desired during the summer and fall months, but fail rapidly after the first heavy frosts, and do not become really good again until April. For making a permanent pasture Bermuda grass and lespedeza are the best foundation; and to these should be added orchard grass, Hungarian or awnless brome grass, and burr clover for the drier soils; while redtop and alsike clover will be the best additions for the wet lands. White clover grows well on the uplands, and the Carolina and creeping clovers give rich grazing in March and April, but soon disappear. On the sandy and gravelly uplands, especially on the Atlantic coast, crimson clover gives excellent winter pasture. Where crimson clover will not grow and the pasture is needed for immediate use, rescue grass and hairy vetch will make good winter pastures; and if stock be taken from the field in March or April, these plants will reseed the ground for the following season, but they will soon disappear under continuous grazing.

ALLUVIAL AND RIVER BOTTOM LANDS.

These soils are almost wholly of recent alluvial formation, are rich in humus, and usually contain an abundance of lime, together with more or less sand. Many of them are subject to overflows and nearly all of them suffer from want of drainage. Being more fertile than the uplands, they produce larger crops of hay and afford a much wider range of choice in the selection of varieties.

For permanent meadows on these lands Bermuda grass, Johnson grass, redtop, alfalfa, and red clover all do well, though Bermuda grass and red clover have given the most general satisfaction. Of the true grasses, Bermuda grass makes hay of the best quality. Its yield is from 3 to 4 tons per acre in two cuttings, and it is not injured by short overflows. Johnson grass also yields heavily, but it is more easily injured by water than is Bermuda grass, and the hay does not sell as well. Redtop bears a longer overflow than does either of the others, and we have found it advantageous to sow it on places where the others are liable to be drowned out, as it adds largely to the yield of hay and keeps down the growth of weeds and coarse grasses. Where the soils are fairly well drained red clover does well and is one of the best crops which can be grown, as the hay finds a ready market at good prices. On soils which have thorough drainage alfalfa makes a heavier yield than any other good hay plant, but it can not be grown profitably on heavy soils or where standing water comes near the surface. When a meadow is wanted for

two years only, red clover is by far the best plant that can be used, while if but a single crop is to be cut, lespedeza is best, especially for the drier soils, in which it can be sown early; and for late sowing German millet has given the best results. For soiling crops we have found nothing better than teosinte, alfalfa, and soja beans.

It is comparatively easy to make good summer pastures with Bermuda grass and lespedeza on these lands, but in the winter the soil becomes so water-soaked and cold that it is difficult to find plants which afford good grazing during that season. Bermuda grass makes the best of summer pasture, but is killed to the ground by moderate frosts and so is of little value during the winter. Johnson grass lasts but a short time when pastured, and red clover is soon tramped out. Redtop is much more lasting and should be sown in every field intended for a permanent pasture. Alsike clover does well on these soils even when heavy and badly drained, and is the best of the family for winter grazing; burr clover also does well. Redtop and rescue grasses grow well where they are not subject to overflow, the former being the more permanent. Carpet grass, a native sort, will make good winter grazing where the soil is dry and sandy. Where pastures are wanted for one season only we know of nothing better than a mixture of orchard grass, perennial rye, and hairy vetch sown in August or September for winter use; with lespedeza and beggar weed for summer use.

The black prairie soils are found principally in western Alabama, eastern Mississippi, and eastern Texas, but though among the most fertile in the whole country they need peculiar treatment to make them productive. While ordinary commercial fertilizers and even liberal applications of stable manure produce little effect on them, the plowing under of an occasional green crop seems all that is necessary to keep them in a state of high productiveness. Most of these lands are quite level, are poorly drained, and remain wet very late in the spring, but pulverize readily when dry, even though they have been plowed while quite wet. They are rich in lime, no better grass lands can be found.

For the production of hay alone, without regard to its effects on the soil, Bermuda is the best grass which can be grown as a permanent meadow. Under proper management, however, these lands are so productive for corn and cotton that most planters prefer to rest the fields with some crop which will give prompt returns in hay and which will at the same time prepare the soil for some future hoed crop. For this purpose, on these soils, there are no plants equal to melilotus and red clover, the former being the more valuable as a fertilizer, while the latter makes the better hay. On soils which contain an excess of lime, are badly drained, or are in poor mechanical condition, melilotus will grow well, give fair returns in hay, and do more than any other plant to put the soil in good condition; while on the better soils red clover is more profitable for hay, and gives to the soil all the green manuring which it needs. Johnson grass also does well here, and a mixture of this grass with melilotus, recommended on another page, makes a heavy yield of excellent hay. Lespedeza grows well on the soils which are not too wet, and is perhaps the best hay crop which can be grown where the field is to be used for that purpose only one year. For a short-season hay crop to follow wheat, oats, or potatoes, either cowpeas or German millet should be used.

As in most other parts of the South, Bermuda grass and lespedeza furnish an abundance of summer grazing in this region; but it has been more difficult to find satisfactory plants

for winter pastures here than for any other soils which have been investigated. Melilotus is thoroughly at home on these soils, and in nearly all localities has been so satisfactory that little else seems to be needed. Alsike clover grows well on the heavier soils, but soon disappears from the ridges and loser soils. Hungarian brome grass, orchard grass and redtop are the best of the true grasses for general use, while Texas blue grass has done well in a few localities. Burr clover and hairy vetch succeed admirably where the soil is fairly dry, but neither will grow where the ground is wet for considerable periods of time.

THE PINE-WOODS REGION.

The pine-woods region reaches from 50 to 150 miles back from the coast, and extends in an unbroken line from Carolina to Texas, except where interrupted by the mouths of the larger rivers. The soil is usually a sandy loam containing but little lime, and underlaid with a heavy clay subsoil. Where the woods are open, native grasses flourish in great abundance, and thousands of cattle and sheep are raised which never see a pound of hay or grain, though the living which such animals get is a hard one, the beef being poor in quality and the wool light in yield. Here hay growing is of less importance than farther north, but it has become generally recognized that, although animals may live through the winters on the native pastures, it is more profitable to shelter and feed them during the heavy winter rains, and that an occasional hay crop is a cheaper and better fertilizer than can be secured in any other way.

On ground which has been well fertilized Bermuda is the best grass for permanent meadows, but a majority of the planters in this region, where the growing season lasts nearly twelve months, find it more profitable to make hay upon lands from which some other crop has been harvested, and in many cases the hay is secured for the bare cost of gathering. Along the Gulf coast crab grass and Mexican clover form the bulk of the hay crop. Both of these plants "come in" on the cultivated lands, and both make a heavy volunteer growth late in the season, maturing at the same time and, if cut before becoming too ripe, making most excellent hay. Alfalfa does well where the soil is sufficiently fertile, and has proved successful occasionally on some of the drier lands of Florida when the seed has been properly inoculated. On the Atlantic coast crimson clover is one of the best hay plants, and its introduction has made great changes in the hay-growing practice of that region. Dr. Battle, of North Carolina, says of it: "Hay made from the crimson (scarlet) clover stands out frequently as the richest of foods. It leads pea-vine hay, lucerne, red clover, timothy, redtop, alsike clover, and orchard grass." Timothy and red clover also do well in North Carolina, and in many localities Johnson grass is highly valued.

When the crop is wanted for its fertilizing effect as much as for its hay, the cowpea is the best plant that can be grown. If sown early in the spring two crops can be made during the season, and if not sown before August the vines will still have time to cover the ground with a dense growth which can be cut for hay, pastured, or left to decay on the ground, at the convenience of the planter. Lespedeza makes heavy crops on such of these soils as contain a small amount of lime; but melilotus has not been generally successful.

For winter pastures in the Atlantic coast region, crimson clover is valued highly, as it makes both winter pasturage and a winter growing fertilizer, being one of the few plants which can be used for this double purpose.

GRASSES.

Redtop, or Herd's Grass.

(*A Perennial.*)

This succeeds well in permanent pastures on all soils containing a fair supply of moisture, on the river bottom lands, and on the "seepy" hills of the yellow-loam region. It will yield one cutting of hay and by repeated mowing it may be made to hold its ground during the summer, but its chief value is as a part of the mixture of grasses for winter pasture. Its growth during the first season is rather weak and disappointing, but it strengthens and improves with age, holding its own well against other grasses and weeds, and is not easily killed by overflows, even when covered with water two or three weeks at a time. It does better on a clay soil than on one which is too sandy, and in favorable locations furnishes good winter grazing. For moist lands it is one of the best varieties that can be used, and after it is once established it increases in yield and quantity each year. It grows from one to three feet in height, according to the soil. We have seen it make a splendid growth on hillside land which was of good quality, but subject to washing. It will not become a pest on the land, and can be destroyed if desired. It flowers in June or July, and should be cut for hay just before seed matures. Redtop and timothy are often sowed together and make an excellent combination. The seed is figured at 14 pounds to the bushel for ordinary grade, but the grade known as fancy cleaned (32 pounds per bushel) is the only one that should be used. If sown by itself, use 8 to 10 pounds per acre. If with timothy, use 6 pounds of redtop and 8 pounds of timothy per acre. Some planters add 5 or 6 pounds of redtop clover to this combination with good results.

Redtop or Herd's Grass

Creeping Bent Grass.

(*Argrostis Stolonifera—Perennial.*)

This grass resembles the redtop or herd's grass in growth and appearance, and is considered by many as fully equal, or even superior, to that grass. It is certainly a splendid grass and well adapted for the South, and should be largely used in mixtures. It has creeping roots and spreads and holds to the soil in a very tenacious way; at the same time it is easily eradicated if desired. When sown by itself sow 25 to 30 pounds per acre.

Hungarian Brome Grass.

(*Bromus Inermis, also called Smooth Brome—Perennial.*)

Seed weighs 12 pounds to the bushel. This grass is a native of southern Russia, and endures our summer heat and drought much better than does its near relative, rescue grass, and, being a perennial, is much more permanent. It remains fresh and green during a very large part of the year and, as it is at its

best during the late fall and early spring months, it is especially valuable for winter pastures. In favorable locations it maintains itself well against other grasses and weeds, bears grazing well, and is not injured by moderate frosts. It produces a great amount of long tender leaves very near the ground, while the stalks are slender and not numerous, so that it is better for grazing than for making hay. It covers the ground more evenly than rescue grass, and for grazing purposes is decidedly superior to that species. Like nearly all grasses it makes its best growth on rich soils, but even on rather thin and barren fields it is one of the best. Seed is produced very sparingly, and is hard to obtain in this country.

Hungarian Brome Grass

Sow at the rate of from 30 to 40 pounds per acre, when sown by itself either in the fall or spring.

Rescue Grass.

(*Bromus Unioloides—Annual.*)

This is a native of the western part of the United States, and was one of the first of our native species to be brought into cultivation, having been grown for many years under the names "Australian oats," "Schrader's brome grass," etc. It is usually an annual, though if grazed closely or mowed frequently the roots will often live several years in rich and not too heavy soil. It makes the best growth during the cooler months, usually starting up in October or November, and continuing to grow until it ripens its seeds in April or May, after which little is seen of it until cool weather comes again, as it does not bear heat and drought. Its growth largely depends on the character of the season, and in favorable years it gives excellent pasture from November to May, while in other seasons it may make but little growth before February. On thin and dry soils its growth is small, from 12 to 15 inches, but on rich and somewhat damp soils it makes a growth of 3 feet or more, with a large proportion of leaves, which are tender, sweet, and nutritious, and which are renewed very quickly after being eaten down. If used for making hay, in a favorable season it will give a good cutting in February and another in April, and the third crop will make sufficient seed to stock the field for the next year. As its growth varies so much with different seasons it can hardly be relied upon for winter pastures, though it never fails to make an abundant growth early in the spring, and its chief value is for mixing with other plants like orchard grass, burr clover and vetches. Along the Gulf coast its growth is less

dependent on the seasons, and in Louisiana it is regarded as being one of the best winter grasses.

This grass, like almost every plant, grows best on good soil. It will be found of great value in Texas, Louisiana,

Rescue Grass, or Bromus Grass

Mississippi, Alabama, Georgia and the Carolinas. It has been grown in western Texas, and has been found to be splendidly adapted for that section, furnishing grazing for winter months, when other grasses are not available. In Georgia its value is well known.

A gentleman who has used this grass for years, writes to us as follows: "The finest grass on my farm was sown on oat stubble in July with whippoorwill peas. I got a splendid crop of peas, and the grass is now (May 13th) a fine stand, and is waist high. It is also splendid to sow with clover, and seems to promote its growth and prevent its suffering from drought. I have a few acres about one-half grass and one-half clover, both about two and a half feet high with no rain for nearly four weeks. It is the finest grass ever grown in this section for pasture for all kinds of stock, and for hay it has no superior."

Rescue grass is an annual and if used for grazing, stock should be taken off of it about April; it will then mature seed, and the land can be plowed up and put into peas or other crops, the grass seed coming up again in the fall.

Seed should be sown in the fall, from August on. We would advise from 30 to 40 pounds per acre, unless it is to be sown with clover, when 20 to 25 pounds may be used.

We would advise our customers in all sections of the South to give this grass a trial. Mr. Reasoner, of the firm of Reasoner Bros., prominent nurserymen and horticulturists, stated to us that rescue grass had given most excellent results on their grounds, and was enthusiastic in speaking of its valuable qualities. They are located at Oneco, Manatee county, Florida, and it is thus seen that the grass does well as far south as southern Florida.

Look out for cheat or chess being sold to you as rescue grass. Around Rome, Ga., cheat is grown quite largely, and parties there offer the seed each year as rescue or arctic grass. We have the true rescue grass seed. The cheat or chess is one of the worst things possible to get into a grain crop, though when grown by itself it affords tolerable grazing.

True rescue grass is of very great value. In Texas it seems wonderfully adapted to supply pasturage during months when other grazing is scarce. It is very nutritious both for hay and grazing.

Orchard Grass.

(Dactylis Glomerata—Perennial. Two to three feet in heighth. Flowers in June.)

This grass is probably more widely cultivated than any other grass in the world. No other grass so easily adapts itself to widely different soils and climates, and farmers in all countries hold it in the highest esteem both as pasture and hay crop.

It commences its spring growth with the first warm days of February, and if not pastured, is ready to cut for hay in April, and will then afford excellent grazing until checked by the summer drought. With the first autumn rains it starts a new growth of leaves, making rich fall pasturage, and remaining fresh and green all through the winter. The hay made from it is of excellent quality, though its habit of growing in large clumps is against its use as a hay grass; but it bears grazing well and recovers quickly when cropped down. It does well when mixed with redtop, and succeeds better than almost any other grass in woodland pastures. Sandy soils are not suited to its growth, and it can not be recommended for any light and thin lands.

It will grow on any soil containing a considerable amount of clay, and which does not hold too much water. There are few wet soils that can not be sufficiently drained to grow orchard grass. Worn-out soils produce heavy crops of it if given a thorough dressing of stable manure before planting, or else have a crop of cowpeas turned under previous to planting. Any soil that will make a fair crop of oats will grow orchard grass. It seems well adapted to all clay soils of the South. It will stand mowing two to four times a year, according to soil, season and treatment, yielding one to three tons of first-class class hay per acre on poor to medium land. Most animals select orchard grass in preference to any other in grazing. In the lower South it can be counted on to furnish almost steady grazing throughout the winter. For hay, it should be cut while in bloom, and after grazing or mowing, it grows from three to six inches per week. As a hay crop it is easily handled and cured. It is one of the easiest of all grasses to get a stand of and its long, deep, fibrous roots readily enable it to withstand droughts that severely injure or kill other grasses.

Orchard Grass

It grows well in open ground or in forest pastures where the underbrush has been cleaned up. It is a long-lived grass, with half a chance lasting under good treatment thirty

to forty years; yet it is easily exterminated if the land is wanted for other purposes. If sown thinly, it has the tendency to grow in clumps, leaving part of the land bare. This may be overcome by thick seeding at the start, using 2 to 3 bushels of the highest grade seed per acre, or red clover can be sown with the orchard grass at the rate of 7 pounds per acre.

It can be sown either in the spring or fall. The seed weighs 14 pounds to the bushel. A good combination for a mixture consists of 11 pounds of tall meadow oat grass, 14 pounds of orchard grass and 8 pounds of red clover.

Bermuda Grass.

(*Cynodon Dactylon—Perennial.*)

One of the most valuable grasses in the South for pasture and hay. Bermuda grass in the South, like Kentucky blue grass in the North, is one of the finest of all grasses for pastures and yields good crops of hay on rich soils. It grows on nearly all soils, but succeeds best where the land is fertile. Withstanding as it does the extreme of heat and drought, it makes a thick interwoven sod and furnishes an abundance of leaves which afford constant grazing throughout the summer months, and will stand more tramping of cattle and the extremes of heat and drought better than any other grass we know of. One acre of Bermuda grass well established on soils adapted to its growth, will pasture 10 sheep for 8 months in the year and in many parts of the South 10 months. Horses, cows and other stock relish and eat it readily, and when its value becomes recognized generally, there will be a revolution of the stock production in the South. Bermuda grass yields 2 to 4 tons per acre on rich soils in the South, and in comparative test with timothy is found to contain more nutritive qualities, and costs about one-half. During the warm months and especially the heated, dry spells, there is nothing that furnishes better pasturage, and though little grazing is afforded in some of the winter months, there are plenty of crops such as rye, crimson clover, rape, Kentucky blue grass, Italian rye grass, etc., which will afford green pasture for the stock during the rest of the season. It is not recommended if the land is to be sown afterwards in cultivated crops, as it is hard to eradicate it. In the South, however, it will stand indefinitely, and if plowed and harrowed in the spring once in 3 to 5 years, the yield will be constantly kept up, especially if an application of fertilizer or stable manure is given occasionally.

It is an improver of soil, and good crops of cotton, corn or wheat are made after Bermuda grass has been made on the land. To eradicate it the soil must be deeply plowed, the roots inverted to the sun in the hot dry weather for two or three weeks, and the land then sown in cowpeas, afterwards followed with a crop of oats or rye and another crop of cowpeas, as this constant shading and growth will smother it out.

Sowing.—It has been popularly supposed that a stand of Bermuda grass can not be obtained from seed, and planting by roots has been recommended and generally practiced throughout the South. This is wrong, as, if good seed is obtained, there is no trouble in getting a stand, and the cost of seeding in comparison to sodding is trifling. The seed should be sown in March, April or May, at the rate of 6 to 8 pounds per acre. Prepare the land well, getting it in as fine condition as possible and make a good firm seed-bed. As the seed is small it should be lightly covered, a roller is preferable, or if this can not be obtained, use a brush harrow and do not cover to the depth of more than half an inch.

It is frequently propagated by transplanting the roots. This may be done preferably when the ground is thoroughly

wet and soft, at almost any time except in the winter months, and is not more expensive than is the seeding of the ground in the ordinary manner. Shave off sods an inch or two in thickness, cut them into pieces about an inch square and drop on the new ground about 2 feet apart each way, stepping on each one and crowding it well into the soft ground as it is dropped. If it is necessary to do the work when the ground is too hard for this method, one man can make small holes with a single stroke of a hoe, while another drops the sods and covers them with his foot. When the ground is in good condition and the sods convenient, one man can plant an acre in a day. Good stands can be secured in time by scattering a dozen or more sods to the acre and then cultivating the land in corn or cotton for two or three years, after which the grass will have become so well distributed that the field will need only to be plowed and harrowed smooth to make a good meadow. If the meadow is plowed and harrowed in the spring, once in from three to five years, the yield is greatly increased, and the grass responds very quickly to an application of fertilizer, especially stable manure.

Bermuda withstands drouth and the scorching rays of the sun better than any other variety. On the sandy soils of the lower South it is the only variety we would recommend for a permanent sod.

For lawns it is also highly prized, as while all other grasses are burned up during the hot season, Bermuda grass will remain green, and, if regularly mown, it will make quite a velvety carpet. The only drawback is that in winter it looks a little brown, but in the Southern States an all-the-year-round *green* lawn can be maintained by sowing English rye grass *every fall* at the rate of 50 pounds per acre and harrowing or raking into the Bermuda grass sod. It will not succeed under trees, or in shady situations, as it seems to love heat and sunshine. Every farm in the South ought to have a good Bermuda grass pasture on it. Seed is sold by the pound.

Perennial, or English Rye Grass.

(*Lolium Pereni. Flowers in May and June. Grows from one to two feet in height.*)

This is a very quick growing grass. If sown in the fall, it makes a dense thick growth, giving good grazing through the

English Rye Grass

winter and spring. It is especially well adapted for lawn use and for pasturage, and can be used to splendid advantage for

sowing on Bermuda sod, as it fills in the season when the Bermuda is dormant. Used in this way on Bermuda grass lawns, the "all-the-year-round" lawn is secured in the South. Seed weighs 14 pounds to the bushel, and can be sown from September 1st on—though early seeding gives best results. Use 3 bushels or more per acre, and if sown on Bermuda sod, run a sharp tooth harrow over the grass before sowing, and repeat this after seeding, so as to give a light covering. This will prove also to be a benefit to the Bermuda when it starts into growth in the spring. The perennial rye is usually not expensive, and should be more generally used both for the lawn and on Bermuda pastures.

Crab Grass.

In the Northern States this is regarded as a troublesome weed and wholly worthless, but in the South its character is very different. It makes a heavy volunteer growth on fields from which wheat, oats, corn, or other early crops have been harvested, and on good soils will yield 2 tons per acre of hay, which, if cut before it is too ripe, is fully equal in value to timothy. In order to secure hay of the best quality it is necessary that it be cut as soon as it is fully grown. On land which was plowed in February, and on which no other crop was grown, we have seen cut four crops of about 1 ton each per acre in a single season. As it makes its best growth late in the fall, and as the hay made from it costs nothing but the harvesting, it is valued highly. It makes its best growth on the sandy pine lands along the Gulf coast, where it furnishes three-fourths of the hay, and where many of the planters say they wish for no better hay grass, as this is good in quality, inexpensive, and a sure crop. Mexican clover is usually found on the same lands, and as it is also a volunteer crop, growing at the same time with crab grass, it adds largely to the yield, and is claimed by many planters to improve the quality of the hay.

Crab grass seed is not on the market, hence we cannot supply it; though we have many enquiries for it. In the lower South it is a very valuable grass, and as it is a volunteer crop on almost all cultivated fields in our section it costs little to grow. A mixture of beggar weed and crab grass is one of the finest for hay, and this can be secured by sowing 6 or 8 pounds of clean beggar weed on any land where the grass grows. From June 1st on, or at the beginning of the "rainy season," is the best time to sow the beggar weed.

Para Grass.

(*Panicum Molle.*)

This has been introduced from the West Indies or South America, and, where the climate is not too cold in winter, will produce an immense amount of forage. It does not mature seed in this country, but the roots live through the winter, the new growth being ready to cut by June 1st, and it will furnish good cuttings every six weeks from that time until the end of the season, although it should not be cut after October 1st, in order that it may have time to produce a crop of leaves to serve as a winter protection to the roots. It is of considerable value near the coast, but is too tender for regions subject to severe frosts.

It is propagated usually from the roots, and seed is not on the market commercially.

Dallis Grass.

(*Paspalum Dilatatum, also known as "Large Water Grass."*)

This is a native species which has received far less attention than it deserves, though it is found in all parts of the

South, growing most abundantly on low, black soils where there is an abundance of moisture. It is a perennial, and spreads slowly from the roots, does not make much showing the first year, but by the second or third year, on suitable soil, it spreads out and makes a very heavy growth and large yield. It seeds freely, and when once started will soon cover a field where the soil is suited to its growth. It grows from two to five feet high, and the stems are rather coarse for hay unless cut early; but it produces an immense amount of long broad leaves, which remain fresh and green during the entire winter excepting after unusually heavy frosts. It endures the longest droughts without injury, bears grazing well, starts into growth early in the spring, and is one of our best pasture grasses. Its habit of growing in clumps is against its use for hay, but it is an excellent variety for mixing with redtop for permanent pastures, as it grows best on the same character of soil and largely increases the yield.

It should be used especially in permanent mixture for hay and pasture, at the rate of 5 or 6 pounds of seed per acre. If sown alone use 8 to 10 pounds of seed, sowing from the middle of March to the last of April on well prepared land. The seed is not plentiful on the market, but if only a small amount of land is sown in this grass, seed can be gathered from this, and larger sowings made. The seed needs a warm moist season in which to germinate, and should not be sown too early.

Timothy.

(Phelum Pratense—Perennial. Flowers in May, June and July. Height two to three feet.)

This makes one of the most popular, nutritious and salable of hay grasses. It is best adapted for sowing on clay or heavy loams, lowlands, or in mountainous districts, although it will do well on any good, stiff, loamy soils, provided moisture is abundant. It does not succeed nearly as well, however, as orchard, tall meadow oat, or herd's grass on soils of sandy or light loamy texture, and not of as much value for pasturage as other grasses. The stand of timothy will also be injured if grazed or cut too closely. The yield of hay on good ground is from 1½ to 3 tons per acre. The practice of sowing the common red clover with timothy is not advisable, as they do not ripen together, the clover being ready two or three weeks before the timothy; thus either one or the other must be cut at a stage which will not give best results. Alsike is the best clover to sow with timothy, as they mature at the same time. Redtop or herd's grass and meadow fescue mature at the same time as timothy and are excellent grasses to sow with it both for hay and pasturage. They

Timothy

will increase the yield of hay to a certain extent, but will very largely increase the yield and value of the pasturage. Timothy by itself requires to be sown at the rate of ½ bushel (22½ pounds) to the acre, or with clover, 10 pounds of timothy and 6 pounds of clover will give a good seeding. A mixture of timothy, redtop, meadow fescue and clover should be sown in the following proportions: 8 pounds timothy, 5 pounds clover, 5 pounds fancy redtop, ½ bushel meadow fescue. These will furnish an excellent mixture, both for hay and pasturage, on good loamy, clay, or low-ground soils.

Timothy draws very heavily from the soil and must be manured or fertilized liberally. The hay from timothy is of excellent quality and is remarkable from the fact that the hay is nearly twice as nutritious if cut when the seed is fully ripe than when cut while in bloom. It requires moist land for best results, and does not bear grazing as well as some other sorts.

We do not recommend timothy for poor land. Seed weighs 45 pounds to the bushel, and only the very best of seed should be used.

Meadow Fescue.

(Festuca Pratensis—Perennial. Flowers in June and July. Height one to two feet.)

This should be very much more largely used than at present. It makes a very good hay and pasture grass, and is particularly valuable for fall and winter pasturage, as it remains green throughout the winter. It succeeds well in nearly all sections of the South, and should be very largely used in pasturage and hay mixtures, being specially suitable for sowing with redtop and timothy for hay, or with these and orchard and tall meadow oat for permanent pasturage. Sow either in the spring or fall at the rate of 2 bushels to the acre, if sown by itself. This is a great drought resister, as the roots penetrate soil 12 to 15 inches. It does well in almost all situations, wet or dry, upland or bottom, and matures large quantities of seed. Sow during August, September and October, or in the spring from February 15th to April 1st.

Meadow Fescue

This is also called Randall grass or English blue grass, also evergreen grass, as it remains green all winter, even under snow. If sown in mixture, use one bushel (14 pounds) of meadow fescue, 5 pounds fancy clean redtop and 6 pounds of timothy per acre. If for grazing, use one bushel of fescue and one-half bushel each of orchard and tall meadow oat grass.

Kentucky Blue Grass.

(Poa Pratensis—Perennial. Flowers in June. Height ten to fifteen inches.)

An excellent lawn and pasturage grass, succeeding best on limestone land, but does well on stiff or clay and medium

soils. It is rather sensitive to heat, but not so to cold weather, and on this account does its best in the fall, winter and spring.

In many places, especially in North Carolina, northern Georgia, and on the lime soils of northern Mississippi, it is of considerable value. On low ground, where the soil is dark colored and contains an abundance of lime, and on "seepy" hillsides, this grass will afford good grazing in the late fall and winter months, *but it is useless to sow it on the dry clay hills or in the sandy pine-woods region.* Here it remains almost dormant during the hot weather, and its chief value is for mixing with Bermuda grass, lespedeza, and other summer-growing species. Seed should be sown at the rate of 40 pounds per acre. It shows but little during the first year from seeding, but if the soil is suitable it continues to improve for many years.

Our "Elmwood Fancy" blue grass is the very best there is to be had. It's pure and clean; free from all weeds and chaff. We make a specialty of blue grass for the extensive lawn work here in Atlanta, where everything depends on having pure, vital seed, free from weeds. Can be sown any time from September to April, but October and November will give best results.

The seed is figured at 14 pounds to the bushel, and 3 bushels per acre is about the right amount to sow. We have a special lawn pamphlet in regard to using this grass for lawn making. If interested, ask for a copy.

Sheep Fescue.

(*Festuca Ovina.*)

Is a densely tufted perennial grass for dry, sandy and rocky soil where scarcely any other species will grow. It roots deeply and forms a dense short tuft, suitable for lawns and pleasure grounds, where the soil is sandy. It affords wholesome food for all cattle, and especially for sheep. Specially recommended for pasturage mixtures. Sow about 25 pounds per acre. Grows ½ to 1½ feet high. It is not a heavy yielding variety, but is very nutritious and stock of all kind like it. Seed weighs 16 pounds per bushel.

Johnson Grass.

(*Sorghum Halapense.*)

A valuable forage and hay plant, distributed largely over the Southern States and is known by various names in different localities, some of which are Means, Cuba, Syrian, European millet, Green Valley, Guinea grass, etc.

Most all farmers in the Southern States are thoroughly familiar with Johnson grass; that is, its habits, growth, etc., but not every one realizes the wonderful value of this grass both as a forage or hay crop. It is looked upon by a great many Southern farmers as the worst enemy to Southern agriculture, on account of the fact that it is very difficult to get rid of. When once it gets scattered over your place it will give you no end of trouble when you want to get rid of it.

Of course where Johnson grass is scattered lightly over a place, it is not profitable, and may become a bad pest, interfering with the growth of other crops. But where it has been planted on a piece of suitable land it will yield more hay and will bring in more money than most anything that can be grown on a farm. A well established plot of Johnson grass may be cut several times in a season if plenty of moisture is present, and ought to afford 3 or 4 tons of valuable hay to the acre, which would present a commercial value of anywhere from $15.00 to $20.00 per ton.

There is a great demand for the hay, as it is more eagerly relished by all classes of stock, and especially horses, than almost any other hay.

The seed of Johnson grass may be sown either in the early fall or early spring. If sown in the very early fall it will make some growth before cold weather sets in, and where the tops will be killed down by very cold weather the roots will remain dormant, and will grow out just as soon as springtime comes. It is sown quite frequently in the fall of the year, broadcast in cotton or corn at the last plowing, but one must bear in mind that when you once sow a piece of land in Johnson grass you have to make up your mind to leave it there as a permanent crop. It is questionable whether it is best to sow Johnson grass seed in the fall or early spring, as very good results are always secured by sowing in the spring after all danger of heavy frosts are over. The ground should be well prepared by deep plowing and thorough harrowing. The seed should be sown broadcast and harrowed in.

The quantity of seed to sow an acre will vary owing to the quality of the seed. If the seed are good, plump, ripe and free from chaff, 1 bushel will ordinarily give a satisfactory stand. Still we always recommend sowing 2 bushels, because it is desirable to get a thick stand of Johnson grass, when the quality of the hay will be much better, and of course yield much larger.

Johnson grass furnishes a valuable pasture for any kind of live stock, as well as hogs, but it appears to have more value as a hay plant, as the pasturing of stock and hogs has a tendency to kill it out.

The hay should be cut when the plants are coming into bloom, at which time the stalks, some of them being very large, will also be tender and succulent and make an excellent quality of hay. The hay should be cured as you would sorghum, only it cures much quicker, and there is not so much danger of losing any of it.

Johnson grass will succeed well on most any kind of soil, but it appears to do better on a heavy soil, and is admirably adapted to bottom land.

The Department of Agriculture says of this grass: "This is at the same time one of the most valuable grasses and one of the most troublesome weeds to be found in the South. It is a perennial, which is easily propagated by either seeds or roots, and which makes its best growth on rich bottom lands, where it soon occupies the whole ground, giving three cuttings of about 2 tons each when in good condition. The planter who wishes to grow hay and nothing else, and who has no regard for the rights of his neighbors, will find this a valuable species. We have never seen it permanently cleared from a field where it had once become thoroughly established."

When Johnson grass is once well established on a plot of ground, it will last for an indefinite period, but it is advisable that the grass be thoroughly plowed up every spring after all danger of freezes are over, as breaking the roots induces them to sprout more freely, and when a very good stand is not present a few more seed may be put in to good advantage.

Three cuttings per year can be obtained. This grass is especially suited for growing on bottom lands that are subject to overflow. It is one of the most valuable of all Southern grasses, withstanding drought or overflow, growing vigorously and affording repeated cuttings throughout the growing season. The seed is usually figured at 24 pounds per bushel.

Italian Rye Grass.

(*Lolium Italicum.*)

This is practically an annual, though it will last 2 or 3 years under very favorable conditions. It is a very rapid grower and withstands both heat and cold. Resists drought well. It is fine for lawn mixtures, and has been used in this way with much success as far south as Jacksonville, Fla. On rich moist soil it is very productive, giving frequent mowings. For temporary meadows it is one of the best, especially on moist, mellow soils. Grows 1½ to 2 feet high. Sow 40 pounds per acre, during August, September or October. For hay mow as soon as the blossoms appear. This grass is very rapid in growth and on good land will give 3 or 4 cuttings in a season. Not injured by moderate overflow. Seed weighs 20 pounds to the bushel.

Italian Rye Grass

Tall Meadow Oat Grass.

(*Avena Elatior—Perennial. Flowers in May or June.*)

One of the most valuable hay and pasturage grasses in cultivation, and it is especially desirable and adapted for the South. It withstands the heat and drought of midsummer and the cold of winter, starts very early in the spring, and continues to give good grazing until late in the fall. For hay, it can be cut twice in a season, and will yield nearly double as much as timothy. Its nutritive qualities are first-class, containing, by analysis, more flesh and muscle-forming materials than timothy, but is not quite so fattening as that grass. It ripens at the same time as orchard grass and gives good results sown with it and red clover.

Tall Meadow Oat Grass

For hay it should be cut as soon as it blooms. Tall meadow oat grass is best adapted for good loamy uplands, but gives excellent results on nearly all soils, and even on light, medium or sandy soils. Farmers who have been sowing this grass for years are especially well pleased with the returns from it, and are sowing constantly increasing acreages each year.

When sown by itself, sow at the rate of 2 to 3 bushels per acre, either in the fall or spring. Sown with orchard grass and red clover, the quantities usually sown are 1 bushel (14 pounds) tall oat, 1 bushel (14 pounds) orchard grass, and 6 pounds red clover. The addition of 4 pounds fancy clean redtop or herd's grass seed to the acre to this mixture increases the aftermath and the yield of grazing. This combination is excellent, and one that has given very satisfactory results. It grows from 2 to 4 feet high, according to soil. It roots deeply, and is thus least affected by drought. It can usually be cut twice a year for hay, and after being cut should be cured by being wet by dew or rain. It should be sown in the fall, from September on, according to latitude. Can also be sown during March and April.

In cases where grass seed is sold at a certain weight per bushel, such as 14 pounds, do not expect this weight of seed to amount to a measured bushel. The "weight per bushel" of grass seed is simply an arbitrary figure, selected for convenience, and adapted generally as standard. Grass seed is bought and sold by this standard, but we mention the above as some of our customers expect a bushel of grass seed (14 pounds) to measure four pecks.

LEGUMINOUS PLANTS.

While the true grasses will always furnish the bulk of the hay crop and the greater part of the pastures, the cultivation of the clovers, melilotus, cowpeas, and other leguminous plants is an essential part of all successful farming, on account of the marked effect which they have in fertilizing and preparing the soil for future crops. The parts of the plants which are above the soil are valuable as food for stock, and those parts which are below the surface of the ground are often of equal value as food for future crops. This is especially true in the South where the subsoil is often very compact and impervious to water, and where the long-continued heat hastens nitrification and causes the rapid destruction and waste of vegetable matter in the soil. As all of the legumes are deep-rooting plants, they aid greatly in loosening the subsoil, and in consequence cause it to suffer less from excessive rains or from drought; they furnish a large amount of humus, and with a proper rotation of crops will furnish all the nitrogen, the most expensive element in fertilizers, that will be needed for other crops. Soils may be rested and greatly improved by the growing of true grasses, but the same effects can be secured more rapidly, economically and profitably with leguminous crops, which at the same time will furnish better grazing and hay for all fattening and milch animals.

There are but few of the legumes which will make permanent pastures or meadows, and for such fields the true grasses must be the main dependence, but in most cases the planter will find it more profitable to follow a rotation which will keep his land in forage crops only so long as may be necessary to prepare it for other crops, and for this two years is usually sufficient. While leguminous crops are restorative in the highest degree for a few years, their long continued

cultivation on the same ground finally renders the soil incapable of reproducing them profitably. A rotation of crops is universally recognized as being an essential to the highest success in farming, and this rule applies to forage crops as well as to those cultivated with the plow and hoe. In the South the planter has his choice among a large number of these restorative crops, which vary from three months to as many years in completing their growth, and some one of which will be found suited to almost every circumstance in which such a crop may be wanted.

Lespedeza, or Japan Clover.

(*Lespedeza Striata.*)

This plant, which came to this country from Japan, was first noticed in South Carolina, but has now become naturalized as far west as Texas and north to the Ohio river. It is an annual which perpetuates itself without care, and will make a fair growth on the poorest and driest clay hills. It starts rather late in the spring, making little show before June; but from that time on it grows rapidly, and is eaten greedily by all kinds of stock until killed by frost. On poor soils its growth is flat and spreading, and it is fit only for pasture; but where the soil is of good quality it will grow from 20 to 30 inches high and yield 2 tons per acre of hay which is fully equal in value to the best clover, and is the most profitable hay which can be grown on thin soils for feeding to milch cows and fattening animals. This is not only one of the best hay and pasture plants, but it is also one of the best for fertilizing purposes, as it sends its roots deep into the ground, and will grow on soils too barren for the growth of other legumes. Like most other plants belonging to the same family, it does best on a lime soil, but it will do well on the

Japan Clover (Lespedeza)

red clay hills where red clover and melilotus fail. It has not succeeded well on the sandy soils of the pine-woods region. Seed should be sown at the rate of 20 to 25 pounds per acre, with oats in the fall, or by itself early in the spring.

Japan clover is an annual, but reseeds itself indefinitely, and when once established on the land it will take care of itself, though it is never a pest. It will spread along the roadside, on ditch banks, and into neglected fields. It is often sowed in woods that are used for grazing, as it will grow well under shade. It is best not to graze it too closely the first summer, but to give the seed time to mature. After the first year it will look after itself. In many cases, Japan clover will kill out both Bermuda grass and broom-sedge.

Crimson Clover.

("A vegetable gold mine.")

A more valuable crop than this annual clover does not exist. It will yield under fair condition 8 to 10 tons of green feed per acre, 1½ to 2 tons of hay, and is considered worth fully $20 to $25 per acre as a fertilizer crop. Its use is increasing very rapidly, and it is only a question of its merits becoming fully known when it will be appreciated and considered as one of the most important crops for farmers everywhere. It succeeds on nearly every kind of soil, except on very poor land, but is particularly valuable on light, sandy or loamy soils. Can be sown at the last working of corn or cotton, or can be sown to follow any cultivated crop, such as cabbage, tomatoes, watermelons, cantaloupes, also with buckwheat. A great many of our truckers also make it a rule to seed crimson clover on any available vacant land as soon as the crops are taken off. It is also particularly valuable for seeding in orchards.

Crimson clover is very generally sown at the last working of the corn or cotton crop. August and September are the best months for seeding, although it is quite frequently sown during July, when corn is laid by early.

One of our customers who has grown this crop for many years says: "I would just as soon plow under a good crop of crimson clover on an acre of my land as to put on twenty tons of stable manure." This man puts in crimson clover from July to November, as his land becomes available.

Crimson Clover

The value of crimson clover for pasturage alone should commend it for universal use, as it furnishes continuous and most excellent pasturage during the late fall, winter and early spring. Wherever sown largely for pasturage the sowing of rye or barley with it will prove of decided benefit. The crop can be grazed during the winter, the cattle or sheep taken off it the end of March or early in April and a full crop made afterwards, which can also be cut for hay or green feed, and

then it will leave the land in a very much better condition than before the crimson clover was sown. Experienced farmers claim that it will increase the yield of corn fully one-third, and that it improves very considerably both the yield and quality of tobacco and cotton crops which follow a crimson clover crop.

When used for hay it should be cut just as it is coming into full bloom, before the seed has a chance to form, when it will make excellent, nutritious hay. If the seed is allowed to form, it injures it somewhat for hay purposes, and it should not be fed to stock after the crop has finished flowering, as it may cause "hair balls" to form in the stomach of the animal.

The sowing of crimson clover in corn or other cultivated crops gives an ideal preparation. In fact, it is surer to get a stand in this way than if the land is freshly plowed and specially prepared, as freshly plowed land is usually too porous, causing the seed to be covered too deeply and not giving the little plant sufficient root-hold after it does start, and a good firm seed-bed is of prime importance to secure a good stand. When crimson clover is sown by itself, the best preparation is to prepare the land some time previous to seeding, and then wait for a rain to fall on the prepared soil before sowing the seed. As soon after a rain as the land is dry enough, a light harrow should be run over the soil, in order to break the crust; then sow the clover seed, covering afterwards with a light or brush harrow. If this plan is followed out, it will almost invariably secure a good stand and good crop of crimson clover, no matter what the weather may be afterwards. Crimson clover should be sown broadcast at the rate of 15 to 20 pounds per acre, any time from July to early in October, the earlier the better.

Alfalfa, or Lucerne.

If you had one copy of every book that has ever been written about alfalfa, you would have a library containing hundreds of volumes, for this is one of the oldest plants known in agriculture, and was grown in the far East centuries before the time of Christ.

During the past few years great interest has been taken in this wonderful clover in almost every section of the United States, and successful alfalfa farmers in the West have made themselves rich in growing it as a hay crop. In the South also numberless farmers have planted it, and many of them have demonstrated that it can be successfully and profitably grown in the South. Many have made failures, as well, and in almost every case the failure can be traced to a definite cause, such as sowing on land not adapted to its growth, or more usually, careless and insufficient preparation of the land. For alfalfa is not an crop that can be put in carelessly on poorly prepared land, and still make a success. It is a perennial, and on the right soil, with proper care, an alfalfa field will last thirty years or more. In fact, there is hardly any limit to its life under the right conditions.

When the plants first appear above the ground they look very delicate and are of a beautiful, emerald green color. The plant grows upright and branching, and its leaves are smooth and three-parted, each part being broadest above the middle and round in outline. The plant produces, after it gets 12 to 24 inches high, bluish purple flowers in clusters distributed on different parts of its structure. When the plants first commence to bloom is the proper time to cut it for hay; on good land it will yield 4 to 5 cuttings each year.

When in "full swing," under favorable conditions, it will

yield 8 or 10 tons of the very finest hay per acre in a year, and has been known to cut as much as 16 tons per acre. The hay is considered better than the best timothy hay in feeding value. Being a legume, it adds nitrogen to the soil, and on account of its very deep-rooting habits, it opens up the subsoil, and in this way improves the land for other crops, as well as enabling it to find and use for itself plant food that is beyond the reach of other crops. It is very common for alfalfa roots to go down eight or ten feet into the soil, and roots 30 feet in length have been seen.

Alfalfa

As a rule, the first cutting in the spring can be made soon after planting corn, which makes it of great value for early green feed on dairy and stock farms, and with average season it can be cut about every six weeks thereafter.

During the first season, the growth goes almost entirely to root, and it does not make a great showing above ground. It is very important that the land should be kept free from weeds at this time, so that the alfalfa may become thoroughly established. It is a good idea to plant it on land which has just grown corn, potatoes, or some other hoed crop, and which is therefore as free from weeds as possible.

Loose, sandy, loam soils are best for alfalfa. Such a soil should have a porous or gravelly subsoil. The soil must be prepared well to succeed with alfalfa, a fine, smooth seed-bed made, and it will be found advantageous always to fertilize the soil to give the young plants a start. Alfalfa may be sown in the South either in early fall or very early spring, fall sowings being usually preferable—from August to the middle of November.

It seems to be an established fact that lime, in some form, is absolutely necessary for the success of alfalfa. If lime or marl is present in the land, either in the soil or subsoil, you may expect profitable results. If not, lime should be applied as a top dressing when the land is being plowed in preparation for seeding. It is not possible to say just how much lime should be used in any given case. It is advisable to begin with a moderate application, and see how it acts on the soil and its effect on the crop. Lime is best applied slaked. Pour water on it and cover it at once with earth so that air can not get to it. In a few days it will be finely pulverized and ready for spreading on the land. On heavy soils twenty to forty bushels of slaked lime per acre can be used to advantage. It should never be mixed with nitrogenous fertilizers, such as poultry or barnyard manure, as it tends to drive off the ammonia. It can be applied in any form that is cheapest and most convenient, such as stone or oyster shell lime.

Good drainage is another necessity for alfalfa. An oversupply of surface water soon rots the roots, and the crop will not live more than a year or two under such conditions.

Land intended for alfalfa must be prepared by deep plowing, and should be just as free from weeds as possible. The first year is largely spent in establishing the plants, and you should not expect to get full crops until after the second or third year.

It has been laid down as a rule that "any land that will grow good corn will grow alfalfa." This is practically a fact. For best results, alfalfa should be planted on rich, loamy soil, where it can find abundant nourishment, and on such a soil it will make a most valuable permanent pasture. It has proven to be a mine of wealth to much of our Western country, and we firmly believe that it will prove equally valuable in the South. Experiment a little with it in various situations, and if you give it a fair chance, our prediction is that you will find it one of your most valuable crops.

In many cases the preparation of the soil must begin several years before the actual seeding takes place, as the soil must be built up and fitted as though for a garden bed. It is a mistake to sow on freshly plowed land. The well settled seed-bed is necessary because the young roots will be killed if they encounter the undecayed vegetation and air spaces incident to freshly turned land.

As already stated, the seed can be sown either in the fall, from August to November, September and October being usually considered the best months, or it can be put in during the spring—say in February or March. It is sometimes sowed broadcast, but we advise sowing in the drill, by all means, as in this way the crop can be cultivated and given a better start. If broadcasted, use 20 to 25 pounds of seed per acre. In the drill, use 15 to 20 pounds of seed, making the drills from 16 inches to 20 inches apart.

As soon as the plants are up enough to show the rows, begin to cultivate, and keep the soil clean and mellow by frequent stirrings.

It should be cut every time it begins to blossom, for if it forms seed, the life of the plant will be shortened.

In regions where alfalfa is not extensively grown it is generally necessary to provide in some way the nitrogen gathering germs which are so important in connection with the growth of all legumes. This can be done by means of artificial cultures or by scattering soil from an established alfalfa field where the roots are known to be well supplied with tubercles. There is some danger in this latter method, as weed seeds and germs of fungous diseases are apt to be introduced. This is especially true in the South. The soil from around the roots of sweet or Bokhara clover (*Melilotus alba*) will inoculate the roots of the alfalfa plant. It is also a good practice to add a pound or two of alfalfa seed to the ordinary grass mixtures, as this will tend to inoculate the ground, and when it is desired to seed down the field to alfalfa the ground will be well supplied with the nitrogen-gathering germs.

This is one reason why alfalfa will often succeed after the second or third trial upon a given piece of ground. The few surviving plants each time enable the germs to develop, and the succeeding crop is able to utilize them and succeed. In fertilizing land for alfalfa, or for any clover, nothing is better than heavy applications of well rotted stable manure. The Texas Experiment Station, in a report on alfalfa, covers many points of interest, and we give herewith an extract from same which applies not only to Texas, but to other parts of the South as well:

"Alfalfa prefers deep, moist and warm soils. Its range of profitable growth under natural conditions in Texas is practically the same as the corn growing belt. Wherever fair

crops of corn can be grown profitable crops of alfalfa may be reasonably expected. Wet soils are distinctly unfavorable for alfalfa, and soils underlaid near the surface with stiff subsoils are ill suited to its long life. Any warm soils with a good moisture content and containing a fair per cent of the mineral elements of plant food will grow alfalfa—the yield per acre depending on the fertility of the land. The rich and fertile river bottom lands and the black lands formed by the decay of limestone formations are ideal soils. Alfalfa delights in the presence of the mineral elements of plant food, especially lime. Alfalfa is a fastidious plant. It is a deep rooted plant and requires deep soils for best results. Much also depends upon the preparation of the seed-bed, even on the most fertile soils, for the reason that it is necessary that the young plant be well supplied with moisture near the surface, and that a vigorous root system be established that will enable it to withstand the effects of frosts and droughts.

"There are none of our forage crops that will respond more readily to a thorough preparation of the seed-bed than alfalfa. It might be said that for best results it is demanded, and no mistake will be made, if the same degree of preparation and careful planting is given the seed-bed for alfalfa as is required by the truck grower for his onion crop. Many failures with this crop in Texas would have been turned into success if this important step had been more carefully considered. Thorough harrowing breaks up the soil into fine particles so that it easily comes in direct contact with the seed, and rolling after planting compacts the surface and serves to hold the moisture around the seed. Alfalfa seed being small, demand favorable conditions for successful germination. Rains following close after rolling of the land are liable to compact the surface of the soil to such an extent as to render it a difficult matter for the young plants to push through. This condition can be remedied by harrowing, which not only breaks the crust and allows the plants to easily push through, but exerts a beneficial effect on the tilth of the soil and the eradication of weed growth.

"Alfalfa may be planted either during the fall or spring, the presence of favorable conditions determining the exact time. Fall plantings in Texas are to be preferred, because a longer growing season is usually obtained before the appearance of unfavorable conditions. Spring plantings, however, are not to be discouraged. Land that has been thoroughly broken up during the winter and well prepared during early spring and that is fairly free of weed growth may be successfully sown in alfalfa. Avoid planting alfalfa on newly broken land.

"Alfalfa demands the utmost care to cure properly, because of the tendency of the leaves to become brittle and shatter. The injurious effects of rains on cut alfalfa is not so much the leaching out of food elements, but the accompanying loss of leaves caused by the extra handling which is necessitated. Alfalfa should be cut when about one-fourth the crop is in bloom. Its protein composition is highest at this time and lowest when in full seed.

"Alfalfa should not be pastured until it has matured a good hardy crown and root system to enable it to withstand the trampling of stock. At least two years should be allowed the crop for this purpose, and even more would be conducive to a hardy crop. If green feed is desired the alfalfa can be cut and fed as a soiling crop during this time. Spring pasturing of alfalfa is responsible for the disappearance of many good stands. At this time of year the plant is just recovering from the effects of low temperature and needs all of its energies. If

cut during early spring, the sickle bar should be set higher than usual."

Alfalfa should be planted on every farm in the Central South and Southwest. Even if it is put in on only a small scale, it will be found profitable and will help tremendously in keeping our hay money at home and solving the feed and forage question. It is much better to prepare one acre in the right way and make a success than to scatter seed carelessly over ten acres and make a failure. We should be glad to have our customers give alfalfa a fair trial, and if the suggestions given herewith are carried out, we confidently believe that the successes will outnumber the failures ten to one. Get the best seed you can buy and make your preparations for the crop as thorough as though you were going to grow a crop of vegetables for market.

Red Clover.

Red clover is becoming more popular each year, and is now quite a common crop in the South in sections where the soils contain a fair amount of lime. It requires a soil which is rich and in fairly good condition to insure a "catch" of the seed. On many soils where it makes a good start and yields two or three cuttings it soon becomes overrun with other plants and is choked out. It is the best of the family to occupy a good soil two or three years, but is of little value on poor soils. Seed should be sown in September at the rate of 10 to 12 pounds per acre, and it will then give a heavy cutting the following May. It succeeds best in the South when sown with no nurse crop. Red clover grows well on rich lime soils which are in good condition, but needs to be managed somewhat differently from the method followed in the Northern States. In the South it should be sown in the fall, as soon as possible after the 1st of September. When sown at that time on well-prepared and finely pulverized soil, the land being rolled to compact the surface soil and prevent it from drying too deeply, the seed seldom fails to germinate and to make sufficient growth to become well established before cold weather. The crab grass and weeds which come up with it are killed by the first heavy frost, and when the warm days of spring come the clover grows so rapidly as to keep down the weeds. On good soil it will make from 2 to 2½ tons of hay in May, with another lighter crop of hay or a good crop of seed in July. In favorable seasons it will make a third cutting, after which it usually begins to fail, and the ground should then be plowed for late corn. It is undoubtedly the best of the clover family for rich soils which are in good condition, but it is useless to sow it on barren fields or on rough and poorly prepared lands of any kind. It has not been satisfactory on either sandy or white lime lands.

Red Clover

Red clover on good land will yield two or three cuttings per year. The first crop makes rich feed, and is the most valuable for hay. The second crop does not make so good a quality of feed. Like other leguminous plants, red clover draws largely for its sustenance from the atmosphere, gathering nitrogen and other constituents required by cultivated crops; its roots penetrate deeply, drawing from the subsoil, thus acting as a soil improver, and not only increasing the productiveness of the land, but putting it in better condition than before. In some sections of the South it is the custom, where tobacco and cotton are largely grown, to "rest" fields every few years. It would be vastly better if, instead of leaving these lands unoccupied, they were sown in red clover. In this way farmers would not only get a crop of forage, but the land would be very much improved by this crop being grown on the soil. Clover, intelligently used, is the farmer's best friend, not only furnishing most nutritious feed, but restoring fertility to worn-out lands. It is strongly to be recommended, however, that clover be used in a rotation of crops, and not grown successively on the same fields. A top dressing of 200 pounds of land plaster to the acre on clover in the spring improves the growth wonderfully. Clover should be cut for hay when in full bloom. Can be sown either in the fall or spring. September and March are the best months for seeding clover. When sown by itself sow 10 to 12 pounds per acre. Sown with orchard grass, 6 or 7 pounds of clover with 1½ bushels of orchard grass per acre will give a liberal seeding.

Burr Clover.

(*Medic. Sometimes known as California or Yellow Clover.*)

The most astonishing thing about burr clover throughout this section is that it is so little known. There was recently brought to our store some samples of burr clover, grown on soil which was so poor that a crop of rye planted on it did not get high enough to cut, yet the clover plants were 2 to 2½ feet in height, and of strong vigorous appearance. The grower stated that the entire field would average a little better than the plants which were shown, the crop being about 3 feet in height. This field was originally planted about 13 years ago. Seed is matured in early summer, after the field has been grazed from late fall all through the winter. The ground is then plowed and a crop of peas or corn is put in; this crop is taken off, and the clover springs up to furnish green feed throughout the winter, or a hay crop in the spring. It matures seed in May or June, and if left to seed the ground the crop makes its appearance again during October or November. After a good crop of this clover the ground is then loose and in splendid condition to make a crop of anything else. If the land on which the clover is seeded is to be used for corn or cotton, when bedding for corn or cotton leave between the rows a space 6 or 8 inches wide unbroken until the latter part of May; you will then have plenty of seed on the ground to give you a good stand in the fall. You can make better crops of corn and cotton by using the same land for this clover in the way we have described than you could by putting the two crops on separate pieces of ground.

Burr clover seed is produced in small prickly pods wound up spirally into a ball. The Southern grown seed is always sold "in the burr," and the supply is scarce and uncertain. We can not always supply this seed, but carry in stock the California grown seed, which is clean, the seed being removed from the burrs. It is sometimes claimed that the home-grown seed is the best, but we have seen magnificent crops grown from the California seed, and many of our customers prefer

it, as it takes less seed per acre and, being clean, it germinates better as a rule.

Burr Clover

If the seed "in the burr" is used sow at the rate of 50 pounds per acre. Growers who have had the most experience with their crop advise the use of 75 or 80 pounds, but 50 pounds per acre will give a good stand. If clean seed is used, 10 pounds per acre will be sufficient. We would recommend the use of the clean seed, as it is more economical and can be depended on to germinate when planted, while the "burrs" often lie in the ground a long time before the seed sprouts.

The planting should be done from July to September, in order that the tough pods may rot and release the seeds. The seed should not be covered deeply, as if this is done it will not germinate, but will remain in the ground for years, and grow only when brought to the surface. If possible it is advisable not to graze or cut the crop for the first year, but let it occupy the land and mature seed.

The second year the crop can be grazed or used for hay, and will then continue to furnish heavier crops of superior quality for each succeeding year.

We would advise all our customers who have not used this, and we know it is a new thing to most of them, to put down at least a small patch of this valuable clover, if only a trial plot. We believe it to be one of the most valuable things that has yet been introduced in the South.

We have found it an excellent plant for sowing on Bermuda grass land, as it matures its seed and dies at about the time the Bermuda grass starts into growth, and when the latter is killed by frosts this soon takes its place. A mixture of these two plants comes nearer giving continuous grazing than any other mixture we have tested.

Melilotus, ór Bokhara Clover.

(*Sweet Clover.*)

This plant bears a close resemblance to alfalfa, but is larger and coarser in every way and is especially adapted for use on lime soils. It will make an excellent growth on any lime lands, even on the "rotten limestone" hills and on soils so barren that they will sustain no other plants, but it is of almost no value on the red clays and the sandy pine-woods soils, which contain little lime. It is a biennial plant, making only a moderate growth the first season, but during the second season it will grow from 4 to 7 feet in height if not cut, and and makes stronger and heavier roots than any other forage crop. At the end of the second season it matures its seed and dies, and the roots then decay quickly. It is not generally liked by animals unaccustomed to it, but as it starts into growth very

early in the spring when other green forage is scarce, stock turned on it at that time soon acquire a taste for it and eat it readily throughout the remainder of the season. When grown for hay one and sometimes two crops can be cut in the fall after sowing in the spring, and during the next season two or three crops may be cut. Unless cut early the stems become hard and woody, and in all cases care is necessary in handling in order to prevent the loss of leaves which readily drop from the stems. Excellent hay may be made by sowing it on lands which have been set in Johnson grass, the mixture seeming to improve the palatability of both. From land cultivated in this manner we have seen three cuttings of about 2 tons each made in a season. As a restorative crop for yellow loam and white lime land this plant has no superior, and for black prairie soils it has no equal. The roots are very long, penetrating the soil to a depth of 3 or 4 feet, are quite large, and by their decay at the end of the second year leave the soil with innumerable minute holes, which act as drains to carry off the surplus water and loosen the soil so that the roots of other crops can go deeper, find more abundant supplies of food, and bear drought better.

Bokhara Clover—Melilotus Alba

Sow at the rate of 10 or 12 pounds per acre in August, September, October, or in the spring in February and March. It is a splendid plant for furnishing honey, and in many sections where bees are kept the seed is scattered along the wayside and in fields in order to produce flowers for honey-making. It is very valuable in any section where honey is an important product.

Alsike, or Swedish Clover.

(Perennial. Flowers in July or August.)

Alsike Clover

Alsike is the best of the clovers for wet grounds, but is of no value on dry soils. On the borders of marshes, seepy hill-sides, and places too wet for other clovers this makes its best growth. It seldom grows sufficiently large to make a good yield of hay, but is an excellent pasture plant, and should always be sown with redtop on the damp places

in a permanent pasture. Sow 8 pounds of seed per acre in September, October, March or April.

Alsike will often do well where red clover is a failure. It is being used much more freely than a few years ago, and many farmers sow it with red clover, using about half and half. We have had some excellent reports on this clover from our customers, especially those in the middle South.

White Clover.

(Dutch, or Honeysuckle Clover.)

White Clover

This is a perennial clover with rather uncertain habits of growth, sometimes covering the ground with a thick mat of vigorous plants and then often disappearing for several seasons. It is a good grazing plant for cattle and sheep. It can be sown at any time from September to March, and is almost always put in with permanent pastures and lawns. It is found in almost every part of the country, and succeeds best on moist ground, or during a wet season. If sown by itself, use 8 or 10 pounds per acre, but if put in with other clovers or grasses, half that amount is enough.

Winter, or Hairy Vetch.

(Vicia Villosa.)

We have a special bulletin on vetch which we will send on request, and which gives complete information on this plant. We should be glad to place a copy of this in the hands of every customer we have, for the winter vetch is one of the great winter cover crops that ought to be put in on every farm in the South. One of our customers says that it is for a winter crop what the cowpea is for summer, and this states the case exactly.

The Department of Agriculture says of it: "Of the 28 vetches which the department has tested this is by far the best. Seed of this species was first sown in October, 1888, and since that time has given heavy annual crops on the same ground has not been plowed since the first sowing. In 1889 another field was sown and has given equally good results. It is an annual plant, similar in growth to a very slender and straggling pea vine, the vines often reaching 10 or 12 feet in length and covering the ground with a dense mat of forage 2 feet in depth. Its seeds germinate with the first autumn rains, and in a favorable season cover the ground by the first of January and then furnish good grazing until April or May. If stock are taken off the field in March the plants will mature and reseed the ground freely for the next year, but if pastured until June the stand will be destroyed. Stock of all kinds eat it greedily, both in the pastures and when cut for hay. It bears our heaviest frosts without injury, and it is one of the few plants which can be grown during the winter for green manuring.

We regard the hairy vetch as being the most valuable winter forage plant which the Department has imported, and un-

Vetch, Sand or Hairy (Villosa)

unhesitatingly recommend it for cultivation on all rich soils. Sow in August, September or October at the rate of 30 to 40 pounds per acre.

For best results it should be sown with rye, oats, or barley, as the stalks of grain support the trailing vetch, and the whole can be cut for hay. It does well sown on Bermuda grass sod, and many of our customers plant it in this way with excellent results.

During the past few years a vetch has been widely advertised and sold under the name of "Oregon Vetch." This is simply the English or spring vetch, and while it has some value, it is much inferior to the winter or hairy vetch. It grows rapidly early in the season, but does not make as heavy a growth, and will not stand any severe cold weather. If you plant it, buy it at reasonable prices as spring vetch, and don't pay an extravagant figure for it as "Oregon Vetch." The Department of Agriculture says of this vetch:

"There is another vetch (*Vicia sativa*), the one commonly known simply as "vetch," which is quite largely grown in some sections of the South, but it is smaller in its growth, less hardy, and in every way inferior to the hairy vetch. The two are easily distinguished, as the hairy vetch has a dark-green hairy leaf and large clusters of purple flowers, while the common vetch has a light-green smooth leaf and small clusters of pink flowers."

Prof. De Loach, of the Georgia State Agricultural College, says the best way to use this "Oregon Vetch" is to mix it in with hairy or winter vetch when sowing. The spring vetch makes a rapid growth early in the season before the hairy vetch starts much, and is of some value on this account, though it may be killed out by cold later, which will not injure the hairy vetch at all.

Send for our complete pamphlet on vetch, with letters from our customers telling how they have used it and what they think of it.

Mexican Clover.

(*Richardsonia scabra.*)

This is not a true clover, but takes its name from its habit of growth, which is similar to that of red clover. It is an annual, a native of Mexico and Central America, and has become thoroughly naturalized in all the southern part of the pine-woods region. A sandy soil seems essential to its growth and, like the crab grass, it is much more abundant in cultivated

fields than elsewhere, coming up after other crops are harvested and making its best growth late in the season. It is of little value for pasture, but when cut for hay the yield is often 2 tons or more per acre. The hay, which is usually mixed with more or less crab grass, is of excellent quality. While its roots do not go as deep as those of the true clovers, it makes such a rank growth that it is of considerable value as a fertilizer and for covering the ground through the winter. The seed is not on the market, and the volunteer crop must be depended on in getting it introduced.

DWARF ESSEX RAPE.

We have been surprised to note how successful many of our customers have been in growing Dwarf Essex Rape. It seems to be getting more popular every year. Essex Rape looks a good deal like a rutabaga plant, but does not form the bulbous root. It is used for forage and green feed, and succeeds well during the cool moist weather of the late fall, winter and spring, in the South. The tops grow from 18 inches to 4 feet high, and the leaves are very juicy and tender and greatly relished by stock of all kinds. Rape grows best on rich land. A fine clay loam gives good results, and it may be said that it will do well on land rich enough to grow good turnips or rutabagas. Put your land in first-class shape by plowing and harrowing, sow the seed during the late summer and fall, either broadcast at the rate of 4 to 6 pounds per acre, or in drills 30 inches apart, which will take about 3 pounds per acre. It can be put in between rows of corn at the last cultivation. If broadcasted, cover the seed with a light harrow.

Rape is especially a fine hog pasture and is also excellent for sheep, all sorts of stock eat it greedily, and it tends to put them in fine condition. At one of the Experiment Stations an acre of rape was used to pasture 20 hogs for three months, at the same time feeding some grain.

There is no danger that rape will become a pest on the land. When rape is planted under the right conditions it

Dwarf Essex Rape

makes a tremendous amount of green forage per acre.

In preparing the land for a crop of rape, it ought to be put in good condition and fertilized as you would if you were going to grow a good crop of turnips, cabbage, wheat or corn.

If planted in drills the crop should be cultivated three or four times, and this method of growing the crop is the most satisfactory. The rape is ready for grazing in about eight or ten weeks from the date of seeding. It is not satisfactory as a hay crop, its chief value being for grazing and green forage. It will endure quite severe cold weather and on account of its quick growth it can be used with success from late summer into the early part of the winter, and by making very early planting it will supply early spring grazing.

The seed is worth about 10 cents per pound, and as the amount of seed necessary per acre is 4 to 5 pounds, it is an inexpensive crop to put in. We recommend it to our customers in an experimental way at least. We get a great many letters in which those who have tried Essex Rape speak very highly of it, and we feel sure that in many cases it will prove a very valuable crop.

Rape is not a legume, but belongs to the same family as turnips and rutabagas.

BACTERIA, FOR SEED INOCULATION.

A great deal has been said lately about the use of inoculating bacteria in planting the seed of leguminous crops, such as cowpeas, clovers, peas, beans, etc. There seems to be no doubt but that this inoculation is beneficial where the seed is planted on land where that particular crop has not been recently grown.

The ability of clovers and other legumes to grow in soil which is deficient in nitrogen, and to add nitrogen to the soil for succeeding crops, is due to certain bacteria which enter the roots of the plants and take nitrogen from the air and convert it into soluble nitrates which are available for plant food. These bacteria usually form small nodules or swellings on the roots of the plants, and these nodules are an indication of the presence of the bacteria. Without these bacteria, legumes, like other crops, exhaust the soil of its available nitrogen. With these bacteria, legumes add nitrogen to the soil.

Most any cover crop does some good. It at least prevents washing and leaching and it adds humus to the soil when turned under. But these advantages are obtained from the legume crop, and in addition the legume gives you the opportunity of drawing great quantities of nitrogen from the air and storing it in your soil for future crops. In cases where the planter is able to fertilize liberally with barnyard manure, there seems to be little advantage in inoculating the seed, though many claim that even then it is profitable to inoculate the seed and that a much greater yield is secured. Liberal applications of manure seem either to contain the bacteria which the plant needs or to favor the development of bacteria that may be already in the soil, *and no better fertilizer can be found for grasses and clovers.*

We have special bulletins on the subject of seed inoculation which we shall be glad to send free on application, and we can also supply the highest grade of bacterial cultures, put up in the most approved manner, and by a firm which makes a specialty of this one thing. We shall be glad to send the bulletins containing full information, method of use, and prices of the cultures, to any of our customers. The U. S. Department of Agriculture endorses the inoculation of leguminous crops as both practical and profitable.

A SUGGESTION.

We want to urge our customers to take advantage of their State Experiment Stations, and the U. S. Department of Agri-

culture in every way possible. The Experiment Stations of the different States are conducted for your benefit, supported by your money, and stand ready to give you all the help and information at their command. We are anxious to help you in every way possible, and are always glad to answer your questions and assist you all that we can, but your State Experiment Station is often in a position to give you better or more definite information than we can. If you want to try certain grasses or clovers on your farm and do not feel sure as to whether your soil or section is suitable for them, write to your State Experiment Station, describe your land, and tell them fully just what you wish to do, and ask for their advice and suggestions. They may have made experiments on exactly the same things that you want to try, and can very likely tell you just what you want to know, and just what to do. They will perhaps have a bulletin covering the subject fully and giving you complete and detailed information. The same applies to the U. S. Department of Agriculture, which is doing a great work for the farmers all over the country. They have excellent bulletins on almost every farm crop, and on hundreds of other subjects that are of interest to the farmer. In preparing this bulletin we have used extracts from two government bulletins, which were prepared by Southern men and with particular reference to Southern conditions. These bulletins are valuable, and it will pay you to get in touch with your State station, and also with the Department of Agriculture, Washington, D. C.

We hope that all of our customers know the address of the Experiment Station of their State, but we feel that this is not always the case, and we give herewith a list of the addresses of the Southern stations so that you can write to the director in charge in case you need information or advice along the lines suggested. We urge our customers to do this, for we know of no better way to get reliable and unbiased advice:

Alabama (three stations)—Auburn, Uniontown, Tuskegee.
Arkansas—Fayetteville.
Florida—Gainesville.
Georgia—Experiment.
Louisiana (three stations)—Audubon Park, New Orleans; Baton Rouge, Calhoun.
Mississippi—Agricultural College.
North Carolina—Raleigh.
Oklahoma—Stillwater.
South Carolina—Clemson College.
Tennessee—Knoxville.
Texas—College Station.

In writing, address your letter: "Director Agricultural Experiment Station," with proper postoffice and State address. They will be glad to serve you, and the stations are established and maintained for that purpose.

H. G. HASTINGS & COMPANY, ATLANTA, GA.

(*Continued from Second Cover Page*)

let the land lie six weeks, then sow cowpeas. Cut the peas for hay in time to sow rye again in the fall. Turn rye under again the next spring, and grow another crop of peas. By the time this second crop of peas is cut for hay the land ought to be in fairly good condition to receive a grass crop.

"The use of fertilizers is one of the most unsatisfactory subjects to handle in the whole range of agricultural science."

Dr. E. H. Jenkins, of the Connecticut State Experiment Station, after a lifetime spent in conducting fertilizer experiments, says: "The only recommendation I can make with confidence is that barn-yard manure is a good thing to put on land."

Professor Soule, of the Tennessee station, recommends the application of fifty bushels per acre of well slacked lime in preparing land for grass in that section. The lime should be applied to the land after plowing, and should be harrowed in. He recommends a top-dressing of fifteen tons of barn-yard manure per acre in addition to the lime, applied before sowing. If commercial fertilizers are used, apply 300 to 600 pounds of a mixture consisting of 100 pounds of sodium nitrate, 250 pounds of acid phosphate and 50 pounds of muriate of potash.

Professor Lloyd, of the Mississippi station, recommends the following: Cottonseed meal 800 pounds, stable manure 800 pounds, kainit 400 pounds, composted, applied at the rate of one ton per acre, and plowed under; or, cottonseed meal 500 pounds, kainit 300 pounds, gypsum or slacked lime 200 pounds, applied after breaking and harrowed in just before seeding. On sandy soils use 300 pounds of phosphate instead of kainit.

Professor Mell, of the Alabama station, recommends, in preparing grass-land, the use of stable manure; or, ground bone 300 to 400 pounds, cottonseed meal 100 pounds, nitrate of soda 50 to 100 pounds.

Professor Killebrew, formerly of the Tennessee station, recommends the following application to be applied to grass-lands, presumably in early spring: Top-dress with 100 pounds of nitrate of soda, and three weeks later with 100 pounds of bone meal or superphosphate. Where there is clover, gypsum may be applied. Use stable manure freely after the fall rains begin; it is the best of all fertilizers for grass-lands in Tennessee.

The following mixture makes a good seeding for one acre: Orchard grass 10 pounds, redtop 5 pounds of recleaned seed, tall meadow oat-grass 12 pounds, red clover 8 pounds and alsike clover 4 pounds. In the absence of barn-yard manure, a dressing of 200 to 400 pounds of a high-grade, complete fertilizer would give the grass a good start. After this grass has been down two years, during which time it ought to give at least two cuttings a year, it should be manured and plowed up for corn. The corn may be followed by rye, wheat or oats next winter. Cowpeas may advantageously follow the grain crop, and give way to the grass crop again in the fall. This makes a four-year rotation, which keeps the land busy winter and summer. If all these crops are fed on the place and the manure returned to the land, this system of cropping can not fail to bring the soil to high fertility in a few years.

We may summarize the subject of preparation of land for grass by saying that it must first be made fairly fertile, if it is not already so, and that it must be plowed deep when in condition to pulverize well, and then be thoroughly fined by the harrow. It is then ready for seed.